Resveratrol inhibits epithelial-mesenchymal transition of retinal pigment epithelium and development of proliferative vitreoretinopathy.

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Authors: Keijiro Ishikawa, Shikun He, Hiroto Terasaki, Hossein Nazari, Huiming Zhang, Christine Spee, Ram Kannan, David R Hinton

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Public Summary:
These results suggest the potential use of resveratrol (RESV) as a therapeutic agent to prevent the development of proliferative vitreoretinopathy (PVR) by targeting Epithelial to mesenchymal transition (EMT) of retinal pigment epithelial (RPE) cells.

Scientific Abstract:
Proliferative vitreoretinopathy (PVR) is a serious complication of retinal detachment and ocular trauma, and its recurrence may lead to irreversible vision loss. Epithelial to mesenchymal transition (EMT) of retinal pigment epithelial (RPE) cells is a critical step in the pathogenesis of PVR, which is characterized by fibrotic membrane formation and traction retinal detachment. In this study, we investigated the potential impact of resveratrol (RESV) on EMT and the fibrotic process in cultured RPE cells and further examined the preventive effect of RESV on PVR development using a rabbit model of PVR. We found that RESV induces mesenchymal to epithelial transition (MET) and inhibits transforming growth factor-beta2(TGF-beta2)-induced EMT of RPE cells by deacetylating SMAD4. The effect of RESV on MET was dependent on sirtuin1 activation. RESV suppressed proliferation, migration and fibronectin synthesis induced by platelet-derived growth factor-BB or TGF-beta2. In vivo, RESV inhibited the progression of experimental PVR in rabbit eyes. Histological findings showed that RESV reduced fibrotic membrane formation and decreased alpha-SMA expression in the epiretinal membranes. These results suggest the potential use of RESV as a therapeutic agent to prevent the development of PVR by targeting EMT of RPE.